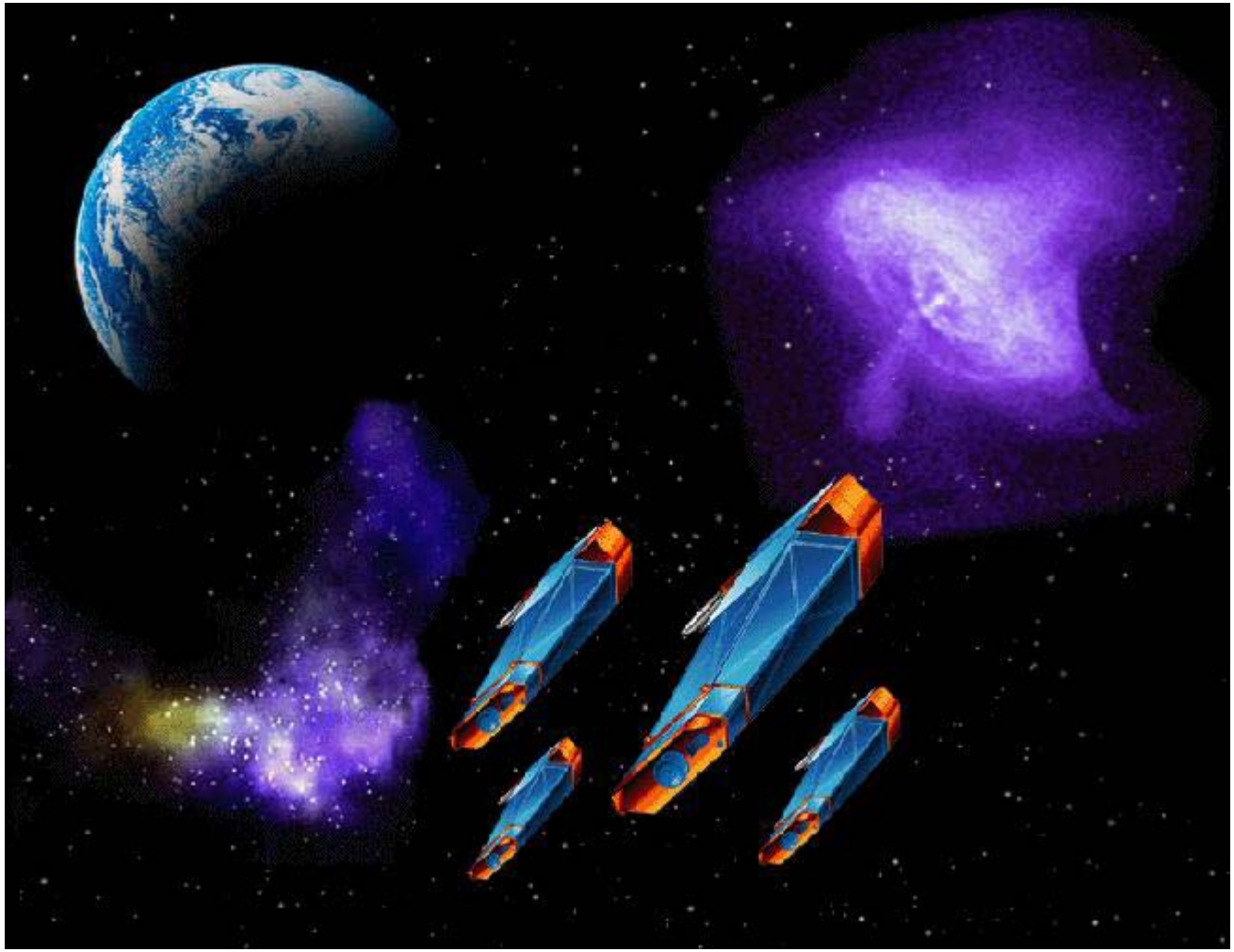
Constellation-X SXT tasks at MSFC



Steve O'Dell
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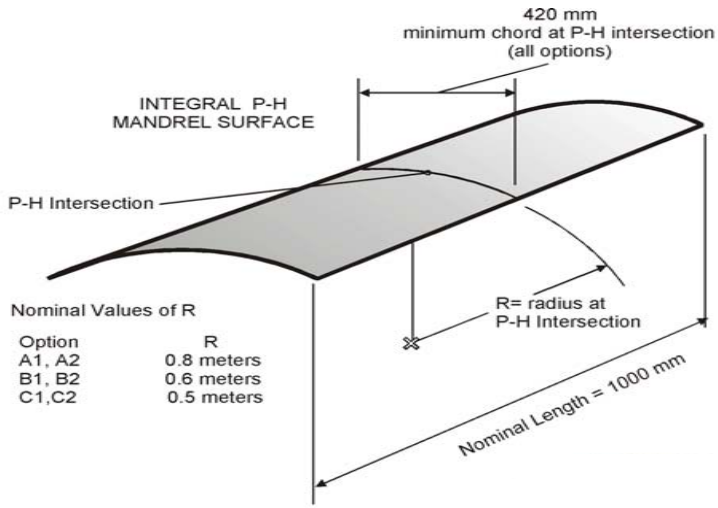
MSFC SXT tasks through FY2003

- **Support segmented-mirror development. (mid-FY2003 completion)**
  - Process 0.5-m cylindrical mandrels for GSFC mirror replication.
    - Chemically strip epoxy, clean, and gold coat the metal mandrels.
    - Ship to GSFC for epoxy-replication runs; repeat cycle upon return.
  - Perform metrology on these Zeiss-fabricated mandrels, as needed.
  - Complete by FY2003 Q3 for replication of SXT OAP/EU mirrors.
- **Procure precision meter-class segment mandrels. (SD70/ Bill Jones)**
  - Procure meter-class Zerodur™ segment mandrels from Carl Zeiss.
    - Will receive mandrel A (30°, 1.6-m diameter) in 2002 August.
    - Will receive mandrel B (30°, 1.2-m diameter) in 2003 March.
    - Will receive mandrel C (30°, 1.0-m diameter) in 2003 November.
  - Conduct acceptance inspection and metrology on delivered mandrels.
- **X-ray test optics. (SD50/ Alan Harmon)**
  - Perform x-ray testing in MSFC's 100-m facility, where possible.
    - Complete design and fabrication of 6-DOF optics mount for 100-m facility.
    - Begin x-ray performance testing of SXT EU and other optics in FY2003.
  - Work on plans for x-ray testing and calibration at 100-m and 530-m facilities.

Support for GSFC epoxy replication

- **Support mirror replication for SXT OAP/EU.**
  - Process Zeiss full-cylinder 0.5-m metal mandrels.
    - Strip epoxy from metal mandrels; precision clean.
    - Deposit gold; pack and ship to GSFC for replication.
  - Repeat mandrel-processing cycle, as needed.
  - Complete processing for OAP/EU mirrors by FY2003 Q3.
- **GSFC will process segment mandrels.**

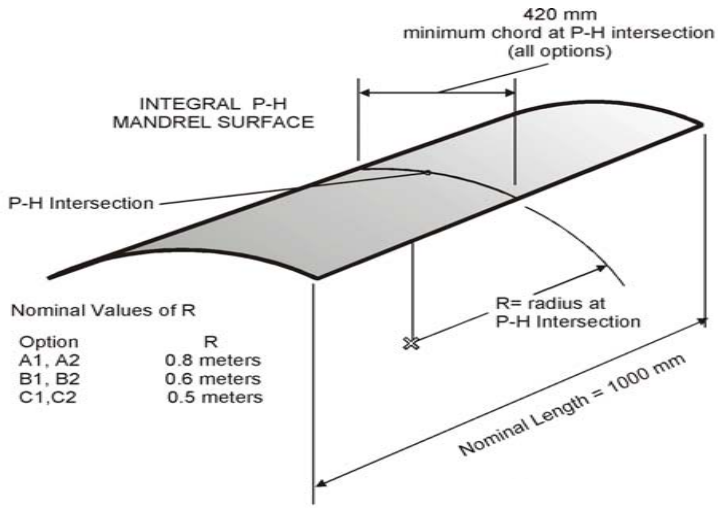
Procurement of segment mandrels



❑ Segment Zerodur™ mandrels

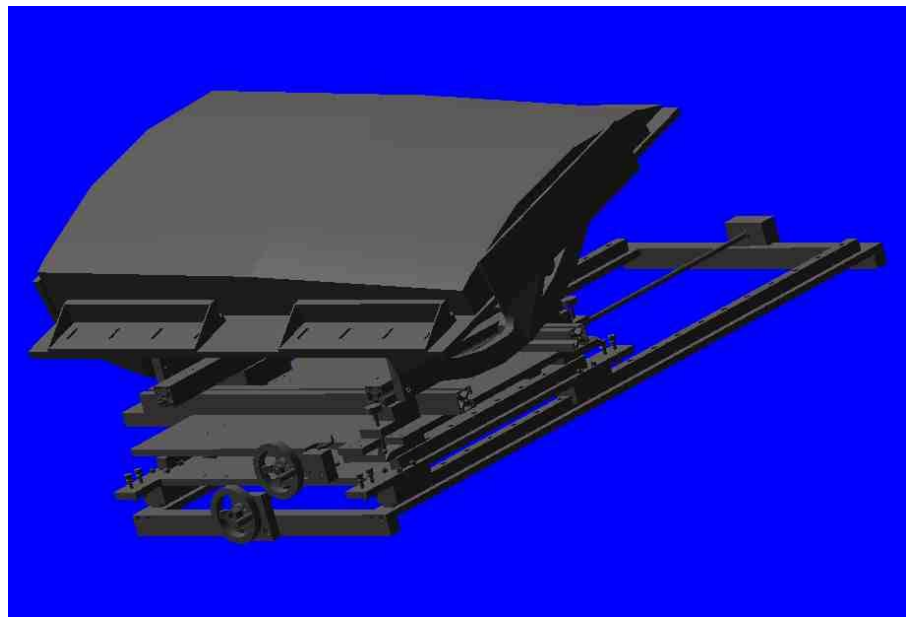
- Procured from Carl Zeiss Laser Optics
- $HPD_{geom} < 4''$, $\sigma < 0.4$ nm ($f > 1$ mm^{-1})
- Optical 30° segments, L = 1.0 m, F = 10.0 m
  - Mandrel A (D = 1.6 m) 2002-Aug delivery
  - Mandrel B (D = 1.2 m) 2003-Mar delivery
  - Mandrel C (D = 1.0 m) 2003-Nov delivery
- For replication of flight-prototype mirrors

Acceptance of segment mandrels

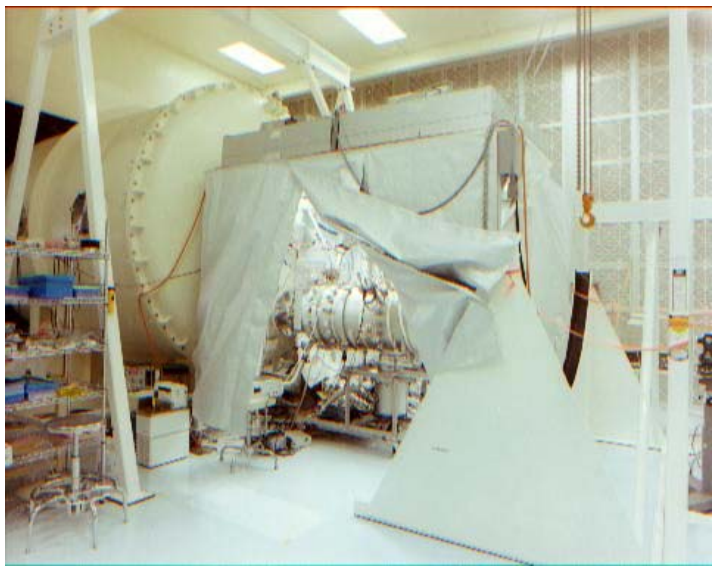


❑ Acceptance procedures for Zeiss mandrels

- Review Acceptance Data Package; inspect.
- Perform acceptance metrology.
  - Axial figure on new (HERO-purchased) Horizontal Long-Trace Profilometer (HLTP)
  - Microroughness on Wyko profilometer
  - Axial slope difference, roundness, and radius on Coordinate Measuring Machine (CMM)
- Pack and re-ship to GSFC.



Characterization of x-ray performance



- **Facilities for testing 10-m focal-length optics**
  - 100-m “Stray-Light Facility”
    - Test SXT and HXT development optics.
    - Use for SXT EU (tilt-compensated) testing.
    - Employ existing x-ray sources and detectors.
    - Design and fabricate 6-DOF optics mount.
  - 530-m X-Ray Calibration Facility (XRCF)
    - Expect first XRCF tests in late FY2005.
    - Use XRCF for SXT prototype demonstration.